BUFFELGRASS CONTROL RESEARCH PROJECT BACKGROUND INFORMATION

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WHY CARE ABOUT BUFFELGRASS?

Across southern Arizona, an invasive non-native plant has introduced a new fire risk and threatens to irrevocably alter our Sonoran Desert. Buffelgrass, (Pennisetum ciliare) is a fire prone and shrubby grass introduced from the African savannah. Buffelgrass grows in dense stands that can crowd out native plants, and creates a fire regime in the desert that never existed before. This potentially leads to devastating fires that can convert the ecologically rich Sonoran Desert into a more monotypic exotic grassland environment.

Buffelgrass spreads aggressively by seed and establishes itself readily in areas that have been disturbed. Once established in the disturbed areas the invasive grass can then move into native desert habitats on hillsides and along drainages. Buffelgrass stands can burn at over 1,400 degrees and are almost three times hotter than fires generated by flammable native vegetation. Buffelgrass fires are highly detrimental to cacti and native trees and can eliminate them from the landscape. The fires don't significantly impact the buffelgrass stands which can come back more vigorously than before the fire.

Over the past five years, the buffelgrass invasion in the Southwest has been the subject of considerable outreach, extensive media coverage and nearly-unanimous consensus over the need to aggressively control this invader grass. Despite the best efforts of a growing group of volunteers, and a growing public investment, control activities have not kept pace with buffelgrass spread. Because this spread is almost exponential- populations of this grass and the costs of controlling it may be doubling every year- time is of the essence and requires working collaboratively and decisively to implement effective control programs.

WHERE DO I LEARN MORE ABOUT THE BUFFELGRASS INVASION?

A multi agency/organization web site has been established to help communicate about buffelgrass as an issue and is a source of information on the ongoing control efforts. Go to www.Buffelgrass.org. Other sources are available and you can contact or stop by Pima County Natural Resources Parks and Recreation for a copy of the brochure Buffelgrass – Wanted Dead and Gone.

HOW DID THIS RESEARCH PROJECT GET STARTED?

In February of 2009, an Interagency Workshop was held in Tucson that brought together scientists, environmental organization representatives and resource land mangers from around the country to discuss

current trends, research findings and control methods for invasive plants. Bufflegrass was a target species of many conference speakers. Out of that meeting a working group of representatives of local agencies, jurisdictions and national experts began to explore shared needs for definitive data on the use of aerial spraying in rugged Sonoran Desert situations.

WHO IS CONDUCTING THE PROPOSED SPRAYING RESEARCH PROJECT?

The project has been a joint cooperative project of scientists and staff of Pima County, USDA Forest Service, National Park Service, University of Arizona, Bureau of Land Management and the City of Tucson. The actual research plots are located primarily on rugged slopes of Tucson Mountain Park where there are already significant existing stands of buffelgrass. The project will be monitored for several years to measure impacts on buffelgrass and native vegetation.

WHY WAS TUCSON MOUNTAIN PARK SELECTED FOR THE STUDY?

The Tucson Mountain Park locations were selected for:

- Accessible but rugged terrain close to town
- Extended distances from residences during spray test
- Existing dense stands of buffelgrass on hard to reach rugged slopes
- Local support for ongoing buffelgrass control efforts in the park since the early 2000s
- Helped in providing an in-kind no-cost contribution from Pima County as a partner in the research project
- City of Tucson cooperation providing access to one physical land study plot in immediate proximity to the Tucson Mountain Park plots

HOW MUCH OF THE PARK WILL BE IMPACTED BY THE STUDY?

Tucson Mountain Park is just over 22,000 acres in size. The twelve study plots will cover less than 10 acres in the park.

WHY SPRAY AT ALL? WHY NOT GET VOLUNTEERS AND EMPLOYEES TO PULL IT UP?

This test was specifically designed to look at the safety, effectiveness and cost efficiency of utilizing computer controlled and GPS based aerial spraying technology in remote and rugged terrain applications in the Sonoran Desert. Unfortunately, buffelgrass continues to expand its distribution and density in natural habitats all around the Tucson basin. The extensive efforts of all the volunteers and limited agency staff working on buffelgrass control have not been able to impact the expansion of the buffelgrass invasion in the rugged foothills and mountains that ring Tucson. Mountainous terrain is a dangerous work environment for most volunteers and even trained crews have major barriers to working in the rugged environments due to the time necessary hiking in and out, the need for onsite water for spray projects, the need to pack tools into remote area and other logistical concerns. The cost per acre of buffelgrass control efforts on sites in the county with steep terrain can easily exceed the cost for more accessible sites with flat terrain by a factor of ten and in the thousands of dollars.

In the Catalina Mountains and Rincon Mountains, the expansion of dense stands of buffelgrass create a fire ladder up the mountain from the previously fire resistant desert ecosystem is of major concern. Labor intensive mechanical control or hand pulling methods will not work on the scale and terrain in this situation. In many areas, the patches of dense fire prone buffelgrass have been seen to double in size in good weather years.

WHAT HERBICIDE WILL BE USED IN THE STUDY?

The active ingredient of the herbicide will be glyphosate. There are over thirty commercial formulations of glyphosate available for use. We will be using an EPA approved formulation of Roundup PROMAX. This herbicide has been routinely used to hand spray or truck mounted spray buffelgrass by agencies, jurisdictions and individuals for years. The herbicide was developed in the 1970's and is readily available as an off-the-shelf product in most garden centers or nurseries.

IS GLYPHOSATE SAFE?

Glyphosate was specifically selected because it is an effective herbicide and has been proven safe when applied correctly according to guidelines approved by the manufacturer and EPA. One primary reference that was used to establish product safety parameters and guide application considerations was the body of research referenced in the report Glyphosate-Human Health and Ecological Risk Assessment prepared for the USDA, Forest Service in 2003. The link to that report can be found at: http://www.fs.fed.us/foresthealth/pesticide/risk.shtml.

For humans, the greatest risk from glyphosate comes as a result of improper and extended handling of the material at high levels of direct exposure. The herbicide is very poorly absorbed across the skin. There is no scientific basis to assert that glyphosate is likely to pose a substantial carcinogenic risk. As noted in the Forest Service's risk assessment, "For members of the general public, none of the longer-term exposure scenarios exceed or even approach a level of concern."

HOW MUCH HERBICIDE WILL BE APPLIED DURING THE TEST?

We anticipate that the final volume for all twelve plots will be approximately 100 gallons. Two application levels will be used in the test, five gallons per acre or ten gallons per acre. These levels are significantly below any manufacturer guideline maximum application per acre per year.

WHAT IMPACT DO YOU EXPECT THE TEST WILL HAVE ON NATIVE VEGETATION AND WILDLIFE?

The study plots that will be sprayed are already badly infested with dense stands of buffelgrass that have crowded out native plants. We expect that the one time application of the herbicide will kill all actively growing buffelgrass and possibly impact native grasses, weeds or flowers. We do not expect any long-term impact to the larger shrubs, trees and cacti based on other activities where spray was applied on all plants; however, this is one question we hope to answer by monitoring the test plots over the next several years.

The herbicide is designed to work by inhibiting synthesis of aromatic amino acids in plants and this metabolic pathway does not occur in humans or other animals. The Forest Service's risk assessment

generally supports the US. EPA conclusions that "Based on current data, it has been determined that effects to birds, mammals, fish and invertebrates are minimal." A recent study done for the City of Tucson as part of its Habitat Conservation Plan, Wildlife Research Report # 2007-07, concluded that there is no apparent glyphosate affect on burrowing owls in the Avra Valley where glyphosate is routinely applied.

WILL THE SPRAY DAMAGE PLANTS THAT HAVE NOT EMERGED YET?

Glyphosate is not a pre emergent herbicide. It does not affect seeds in the ground. Native plants that sprout immediately after the treatment should not be affected. It will also not impact underground rhizomes or rootstock of perennial plants.

This also means that the buffelgrass seed in the ground will sprout under the right conditions requiring future treatments to fully control it. Current research indicates the potential viability of any bufflelgrass seed to be at 3-5 years. Fortunately, following effective treatments the next generation of buffelgrass is far smaller in numbers and generally density thereby allowing native plants a chance to reestablish themselves as well. Additional buffelgrass treatments of the study plots will not occur during the monitoring phase of the project.

HOW LONG WILL THE HERBICIDE STAY ACTIVE?

Glyphosate was chosen because it has a short active life span and degrades quickly. In our test environment, we expect the glyphosate spray to dry upon surfaces within minutes of application and become relatively immobile. Once the spray comes in contact with a plant it immediately goes to work inhibiting its growth. Because the spray is poorly absorbed through the skin of animals, potential effects are further minimized. Before an animal can ingest enough treated plant material to raise any contact toxicity concerns the material will have been degraded even further. The material applied is strongly absorbed to soil and will not runoff into drainages and water systems even if rains occurs within several hours of application. The herbicide is relatively non-persistent and does not stay residually within the soil or move through the food chain.

HOW WILL YOU CONTROL POTENTIAL SPRAY DRIFT?

Two major strategies are being used to reduce potential drift concerns. First, the helicopter used to deliver the spray will be utilizing GPS computer driven technology to precisely deliver the spray within the boundaries of the plots. Each plot has been GPS mapped and the geographical reference points will be used by the onboard computer to turn spray delivery on and off. A special boom designed to deliver precise droplet size that does not produce fine mist spray will be used to deliver the spray from no more than 30-50 feet above the ground and at ground winds of less than 5 mph.

Second, the herbicide spray will be delivered in a very coarse (large) droplet size and will not be a mist spray more commonly seen in agricultural applications with fixed wing aircraft. The droplet size is very large and will fall straight down based on previous application experience elsewhere and actual modeling of drift potential. At a slow forward movement or hover, a helicopter actually generates a down draft where spray can be delivered before it might be scattered by vortices around the edges of the rotor wash.

WILL ANY SPECIAL SAFETY PRECAUTIONS BE PUT IN PLACE FOR THE PUBLIC AND/OR TEST STAFF?

A number of procedures and precautions have been planned into the project. Local residences that are close to the test area will be notified of the test and what is going on. No residence is within a distance that causes any concern based on potential overspray modeling and previous observations by science team members.

Safety is a primary concern in any operation that includes aircraft, ground crews and herbicide applications. A safety plan has been developed and will be reviewed by all participants during any operations. Aircraft safety has been provided for and project monitors will be in place to stop operations if any concerns are raised.

Temporary closures of any hiking trails in the immediate vicinity of test plots will occur in Tucson Mountain Park where secondary exposure might occur during the recommended restricted entry interval of four hours.

Ground staff will be briefed and monitored to stay well away from plots during active spray operations and precautions for necessary personal hygiene will be observed during and after the test operations.

WHAT IS THIS PROJECT COSTING AND SPECIFICALLY, PIMA COUNTY?

A specific project cost was never developed because of the multi-agency approach to the project and because most of the cooperators are utilizing funds from their current annual operating budgets for invasive species. The project has been developed to minimize direct costs as much as possible and rely on in-kind support from the partners.

Pima County is not providing any direct dollars to the project. All of the county contribution is in the form of in-kind manpower, technical support and access to the buffelgrass infested plots for the study. Several county agencies have been involved in the project planning with Natural Resources, Parks and Recreation having the lead responsibility.

FOR ADDITIONAL INFORMATION CONTACT:

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